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(71) Applicant

Ahmad Tun Syed Nasir Syed,

91 Lindsay Drive, Kerton, Harrow, Middlesex HA3 0TH

(72) Inventor

Ahmad Tun Syed Nasir Syed

(74) Agent and/or Address for Service

J. F. Williams & Co,

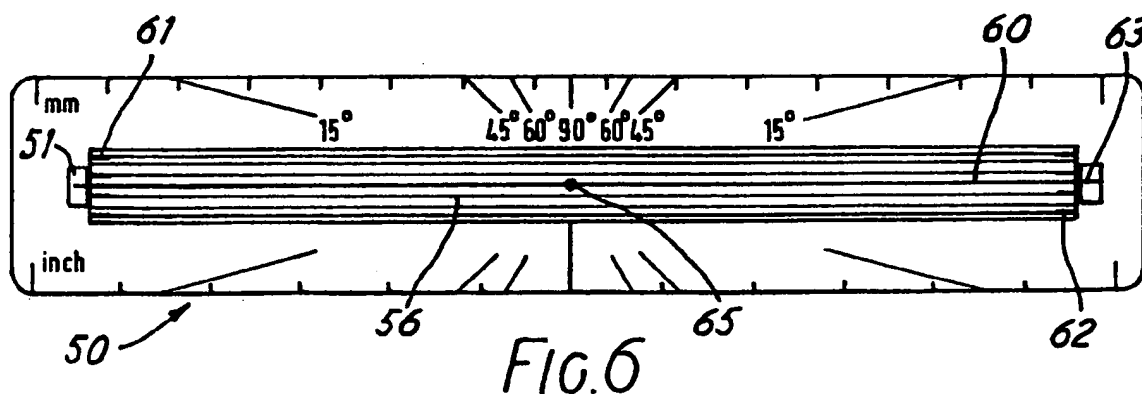
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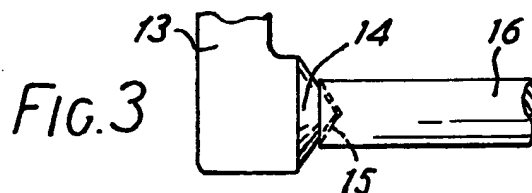
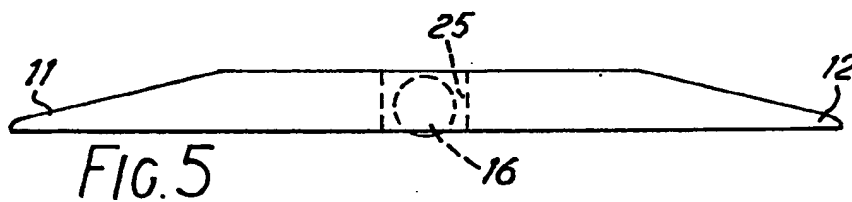
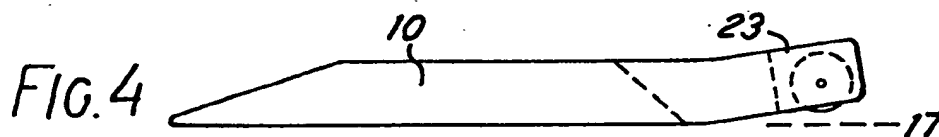
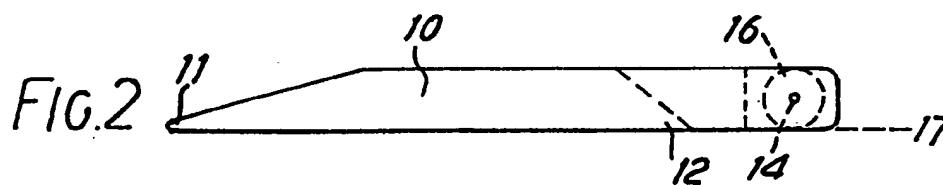
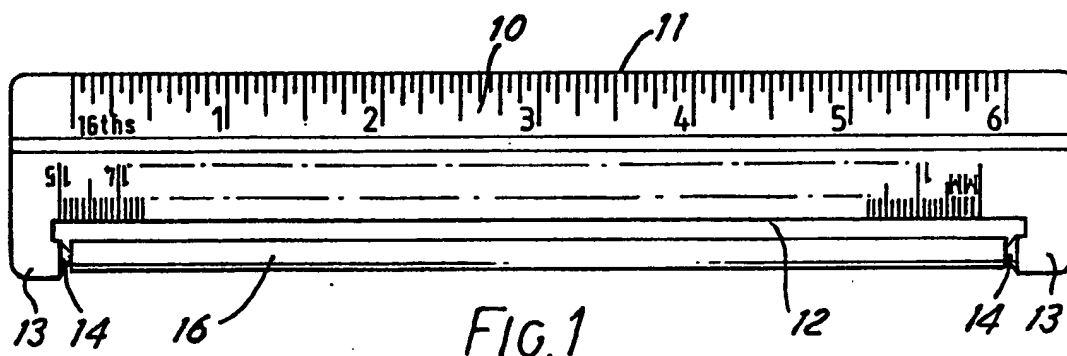
(54) **Ruler**

(57) A ruler has an elongate roller 56 attached to it with its axis of rotation parallel to the straight edge and its periphery close to the plane of the underside of the ruler. The periphery of the roller at its upper side is accessible over at least most of its length to allow manual pressure on it during rolling. The roller carries marker lines 60 and edge markings 61 which can be aligned with fixed marks 51 to facilitate production of hatching lines, whilst a diametral hole 60 is located at the centre of the protractor markings. The ruler body may be provided with inclined slots for cross-hatching, and also with stencil apertures.

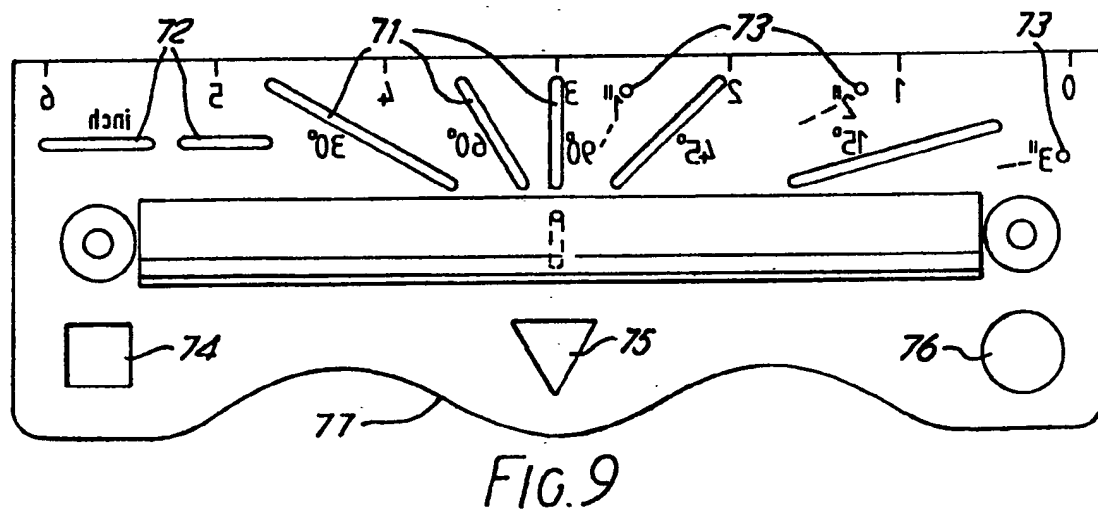
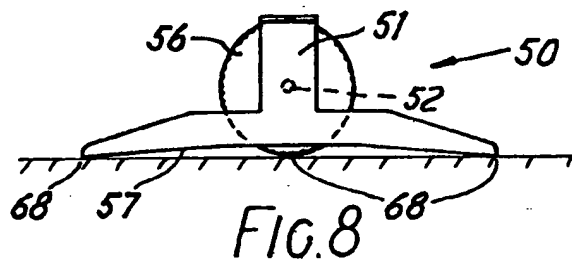
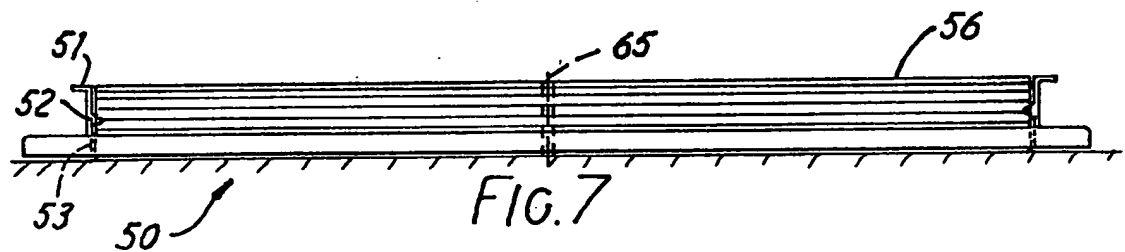
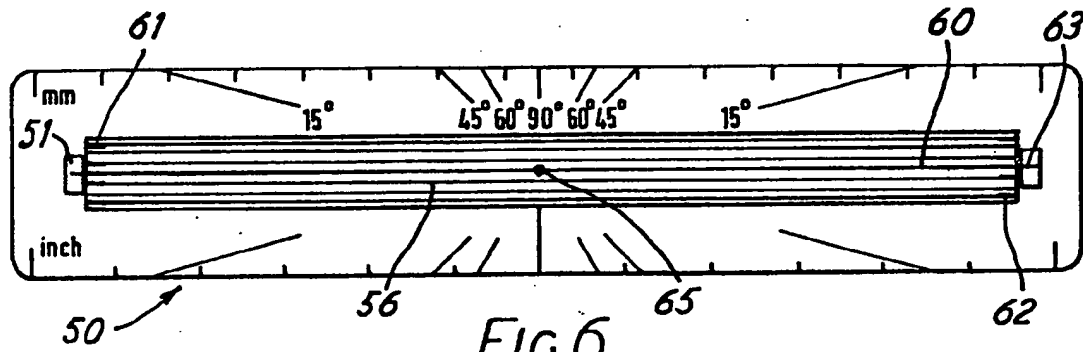


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SPECIFICATION

Ruler

- 5 This invention concerns rulers for drawing lines, as used for example by draughtsman and schoolchildren.

It is often required to draw a series of parallel lines as part of a drawing or diagram.

- 10 Unless a drawing board with a tee square is available, and a variety of set squares is the lines are to be vertical or diagonal, such a series is usually drawn by eye, sliding a straight edge across the paper.

- 15 The invention aims to provide a ruler which can be used for this purpose and which provides greater ease of use and accuracy.

- According to the invention, there is provided a ruler having attached thereto at least one elongate roller with its axis of rotation parallel to the straight edge and its periphery close to the plane of the underside of the ruler, wherein the periphery at the upper side of the ruler is free over a substantial portion of its length to allow manual pressure thereon during rolling. Preferably there is only a single roller which extends along the whole length of the ruler.

- According to a second aspect of the invention, there is provided a ruler having attached thereto at least one elongate roller with its axis of rotation parallel to the straight edge and its periphery close to the plane of the underside of the ruler, wherein the ruler has at least one subsidiary straight edge at an angle to the straight edge which can be used to produce cross-hatching obliquely of the direction of rolling of the ruler.

- In order that the invention shall be clearly understood, several exemplary embodiments will now be described with reference to the attached drawings. In these:

- Figure 1* shows a plan view of a ruler according to a first embodiment of the present invention;

Figure 2 shows an end view of the ruler of *Fig. 1*, to an enlarged scale;

Figure 3 shows a detail of the roller mounting, still further enlarged;

- Figures 4 and 5* show end views of second and third embodiments of the invention;

- Figures 6, 7 and 8* show respectively plan, front and end views of a ruler in accordance with a fourth embodiment of the present invention; and

- Figure 9* shows a yet further embodiment of the present invention.

- In *Fig. 1*, a ruler 10 of moulded plastics material has, as is conventional, measuring scales along two straight edges 11, 12. At its opposite ends, it has projecting arms 13 which are so formed as to provide bearings 14. These, as shown particularly in *Fig. 3*, are conical, and lodge in bearing recesses 15 in opposite ends of a circular rod or roller 16.

The roller 16 lies preferably exactly parallel with the straight edges 11, 12. The diameter of the roller 16 is such that its circumference lies in the plane 17 of the underneath of the ruler 10 (see *Fig 2*). Further, its circumference is preferably shaped or roughened so that it will not slip across paper.

The ruler operates as follows:

- A line can be drawn using either straight edge at one place on a sheet of paper, pressure being applied to the top of the ruler itself to hold it still. Pressure is then applied to the roller 16 to bring its circumference firmly into contact with the paper, pressure on the ruler itself being reduced. The whole ruler can then be slid forwards or backwards at the same time as the roller 16 rotates in contact with the paper and without slipping. This rolling action ensures that at the end of the movement, the new position of the straight edges is exactly parallel to the line already drawn. No reliance need be placed on assessment by eye, and no additional tee squares or drawing board are required.

- Alternative versions of the invention are illustrated in *Figs. 4 and 5*. In *Fig. 4*, the roller 16 is arranged so that it is not normally in contact with the paper. The arms 23 are canted upwards to introduce a spacing above the plane 17. When the ruler is to be moved, it must first be tilted back onto the roller 16.

- In *Fig. 5*, the two straight-edges 11, 12 are placed at opposite sides of the roller 16, which is located in a similar bearing arrangement within a slot 25 running the whole length of the middle of the ruler 10. The circumference of the roller may coincide with the plane 17 or be slightly below it, as shown. In the latter case, one straight edge is canted up slightly when drawing against the other.

- It is possible that the roller 16 might be split into two or more lengths, but this is not preferred because there is then the danger of the lengths rolling differentially so that the ruler becomes skew to its original position.

- The arms 13 are illustrated as integral, but it is envisaged that they might be provided in a form which clip onto a ruler at each end. Moreover, other forms of bearing can be envisaged for the roller 16.

- Referring now to *Figs. 6 to 8*, there is shown a ruler 50 in accordance with a fourth embodiment of the present invention. The ruler bears measuring scales along its two long edges and also protractor markings. The ruler is of moulded plastics material and has at its ends two parallel integrally-moulded arms 51 projecting perpendicularly from the plane of the ruler and each having an inwardly directed, moulded bearing pin 52. The ruler has a central rectangular aperture 53.

- Rotatably-moulded on pins 52 is a roller 56 which extends through aperture 53 and protrudes below the ruler's lower surface 57 which is slightly concave, see *Fig. 8*. Thus the

ruler 50 has three points of contact 68 with the underlying flat surface. The ruler is moved along a surface by means of the user's fingers directly pushing on the roller 56 itself. The

5 surface of the roller is fluted or knurled to provide a good grip. It bears at least one marker line 60 which extends along the entire length of the roller, and a plurality of edge markings 61, 62. In conjunction with a marker
10 line 63 on the top surface of each arm 51, these permit parallel hatching lines to be drawn at regular intervals.

A diametrical hole 65 is provided at the centre of the roller; the position of the hole
15 corresponds to the centre of the protractor markings. A point (not shown) inserted in the hole 65 serves as a pivot whilst angles are measured off with the protractor.

An advantage of the embodiment of Figs. 6
20 to 8 is that accurate movement of the ruler is achieved by the user pushing the roller itself, by the roller being in contact with the underlying surface along its entire length, and by the surface of the roller being formed to provide a
25 good frictional grip.

In addition the provision of markers permits regularly-spaced parallel lines to be drawn.

The same modifications may be made to the embodiment of Figs. 6 to 8 as to the
30 previously described embodiments.

In Fig. 9, certain additional features appear. The operation is otherwise similar to the versions described above.

In this case, a series of angled slots 71 are
35 provided through which a pen or pencil can project to draw a line. These can be used for cross-hatching by moving the ruler, using the roller, between each stroke of the pen. This is a better method than cross-hatching by turning
40 the ruler at an angle, because in the latter case the ruler inevitably moves sideways across the area to be hatched.

Slots 72 can be used for drawing, e.g. a
45 coil spring, by drawing to-and-fro along the slot as the ruler is moved continuously across the paper. Alternatively, a sine wave might be drawn.

Given a pin hole, as 65 in Fig. 7, holes 73
50 are used to draw circles of a specified radius. For the purpose of anchoring the roller while used in such a way, a pin may be provided with the ruler which has at its head a yoke which straddles the roller. The ends of the
55 yoke then bear on the upper surface of the roller to fix the latter against rotation.

Finally, specific apertures and edges 74, 75,
76 and 77 allow those particular outlines to be drawn. Edge 77 can be used for drawing a sine wave along a zero line; it can also be
60 used to draw a curved or wavy cross-hatching.

CLAIMS

1. A ruler having attached thereto at least
65 ne elongate roller with its axis of rotation

parallel to the straight edge and its periphery close to the plane of the underside of the ruler, wherein the periphery at the upper side of the ruler is free over a substantial portion
70 of its length to allow manual pressure thereon during rolling.

2. A ruler according to claim 1 having a centrally-arranged aperture in which the roller is located.

3. A ruler according to claim 2 wherein the
75 roller is mounted on a pair of parallel arms extending out of the plane of the ruler.

4. A ruler according to claim 3 of moulded
80 plastics material wherein the arms are integrally moulded therewith.

5. A ruler according to any preceding claim wherein the ruler and the roller bear marks which can be selectively aligned by rotation of the roller relative to the ruler.

6. A ruler according to any preceding claim
85 wherein the roller has a diametrical hole.

7. A ruler according to any preceding claim wherein the lower surface of the ruler is concave.

8. A ruler according to claim 1, wherein
90 the roller is mounted to one side of the ruler on a pair of parallel arms extending generally in the plane of the ruler.

9. A ruler according to claim 1, wherein
95 the roller is mounted to one side of the ruler on a pair of parallel arms extending slightly out of the plane of the ruler.

10. A ruler according to any one of claims
100 3, 8 and 9 wherein the arms are clipped on to the ruler.

11. A ruler having attached thereto at least
one elongate roller with its axis of rotation parallel to the straight edge and its periphery close to the plane of the underside of the
105 ruler, wherein the ruler has at least one subsidiary straight edge at an angle to the straight edge which can be used to produce cross-hatching obliquely of the direction of rolling of the ruler.

12. A ruler substantially as hereinbefore
110 described with reference to Figs. 1 to 3, Fig. 4, Fig. 5 or Figs. 6 to 8, or Fig. 9 of the accompanying drawings.

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